American in construction, whilst for girders of moderate span, such as those on the many miles of elevated railway in New York, riveted girders of purely European type are admittedly the cheapest and most durable. From my conversations with leading American bridge builders, I am satisfied that their future practice and our own will approach still more nearly. We should never think of building another Victoria tubular bridge across the St. Lawrence, or repeat the design of the fallen Tay Bridge, nor would they again imitate in iron an old timber bridge, or repeat the design of the fallen Ashtabula bridge. In one respect the practice in America tends to the production of better and cheaper bridges than does our own practice, and it is this: each of the great bridge-building firms adopts by preference a particular type design, and the works are laid out to produce bridges of this kind. It is an old adage that practice makes perfect, and by adhering to one type, and not vaguely wandering over the whole field of design, details are perfected and a really good bridge is the result. Engineers in America therefore need only specify the span of their bridge, and the rolling load to be provided for, with certain limiting stresses, and they can make sure of obtaining a number of tenders from different makers of bridges, varying somewhat in design, but complying with all the requirements. With us, on the other hand, it is too often the privilege of a pupil to try his 'prentice hand on the design for a bridge, and it is no wonder, therefore, that many curious bits of detail meet the eye of an observant foreigner inspecting our railways.

The magnificent steel wire rope suspension bridge of 1600 feet span built by Roebling across the East River at New York well marks the advanced state of mechanical science in America as regards bridge-building. It is worthy of note that, at the second meeting of the British Association, held so long back as 1832, there was a paper on suspension bridges, and the author entreated the attention of the scientific world, and particularly of civil engineers, to the serious consideration of the question: "How far ought iron to be hereafter used for suspension bridges, since a steel bridge of equal strength and superior durability could be built at much less cost?" "I earnestly call upon the ironmasters of the United Kingdom," said he, "to lose no time in endeavouring to solve this question." In this, as in many other engineering matters, America has given us a lead. America, is indeed, the paradise of mechanics. When the British Association was inaugurated, years ago, there was, I believe, no intention to have a section for the discussion of mechanical science. Possibly it may have been considered too mean a branch. Even the usually generous Shakespeare speaks contemptuously of "mechanic slaves, with greasy aprons, rules, and hammers;" and our old friend Dr. Johnson's definition of "mechanical" is "mean, servile." We have lived down this feeling of contempt, and the world admits that the "greasy apron" is as honourable a badge as the priest's cassock or the warrior's coat of mail, and has played as important a part in the great work of civilising humanity and turning bloodthirsty savages into law-abiding citizens.

As I have had occasion to refer to Canada and America in the course of my remarks, I cannot refrain from expressing the high appreciation which I am sure every member of this Section entertains of the cordiality and warmth of our reception on the other side of the Atlantic last year. Such incidents make us forget that differences have ever existed between the two countries. I was amused the other day, on reading in Dr. Doran's "Annals of the Stage," that, in the year 1777, the theatrical company from Edinburgh was captured on its voyage to Aberdeen by an American privateer, and taken off Heaven knows where, for it did not turn up again. This, you will say, was a long time ago; but, if you glance through the speeches of our present gracious Sovereign, you will find one in which her Majesty speaks with "deep concern" of insurrection in Lower Canada, and of hostile incursions into Upper Canada by certain "lawless inhabitants" of the United States of North America.

This is strange reading, after our last year's experience. Gentlemen, I may not have carried you with me in some things I have said, but I think you will all agree with me in this: that the statesman who should suffer any slight difference of opinion to develope into a serious breach between ourselves and our brethren in Canada and cousins in America would, to quote the words of Burke, "far from being qualified to be directors of the great movements of this empire, be not fit even to turn a wheel in the machine."

NOTES

THE new gallery of fishes at the Natural History Museum is now open to the public, and an addition has been made to the Osteological Gallery by throwing open the pavilion at the west end, in which are exhibited skeletons and skulls of elephants, the giraffe, &c.

A REPORT is current in Rome that the members of the Italian Expedition to Central Africa, under the leadership of Signor Alfredo Massari, have been massacred.

THE natural history collections made by the late Dr. Nachtigal, in the course of his tour of annexation on the west coast of Africa, have arrived at Berlin in twenty cases, and the greater part of their contents will be assigned to the new ethnological museum.

AN astronomical-mathematical section, under the presidency of Profs. Reye and Christoffel, of Strassburg, has been formed in the Scientific Congress at Strassburg.

M. BOUQUET, a mathematician of some eminence and a Sorbonne professor, died on the 10th instant at the age of sixty-six.

THE death is announced of Mr. W. A. Guy, M.B., F.R.S., on the 10th inst., in the seventy-sixth year of his age. He was for a number of years Dean of the Medical Department in King's College, and Professor of Hygiene. He was admitted a Fellow of the Royal College of Physicians in 1844, held office as censor in 1855, 1856, and 1866, and as examiner in 1861–3, and in 1861, 1868, and 1875 was appointed Croonian, Lumleian, and Harveian lecturer. Mr. Guy also held a number of other appointments, among which were—honorary secretary to the Statistical Society in 1845, and President in 1873, examiner in forensic medicine at the University of London in 1862, Swiney Prizeman, 1869, and Vice-President of the Royal Society in 1876-7. Mr. Guy devoted much attention for many years to questions of sanitary reform and social science, and in 1878 was appointed one of the Royal Commissioners to inquire into the working of the Penal Servitude Acts; also in 1879 a member of the Criminal Lunatic Commission. He was the author of many essays on physiology and kindred subjects, and also of works of a more general character. Among his principal publications may be mentioned "Principles of Forensic Medicine," "Public Health," "The Factors of the Unsound Mind," "John Howard's Winter's Journey," and his last work, "The Claims of Science on Public Recognition and Support." It may be added that Mr. Guy was likewise editor of Hooper's "Physician's Vade-Mecum."

COL. PRJEVALSKY has sent the following message, dated July 1, from his camp in Chinese Turkestan:—"It is impossible to penetrate into Tibet by the Keria Mountains, the passes through them being impracticable for our beasts of burden, and the Chinese having obstructed the paths with rocks, and having also destroyed the bridges. The native population has given us everywhere a good reception, and, despite the interference of the Chinese, their sympathies with the Russians are openly pronounced. We shall pass the present month among the snow-covered mountains between the rivers of Keria and Khoten. About the middle of August we shall go to Khoten, and then by the course of the river of the same name to Aksu. All is well."

THE inaugural address at the commencement of the medical session 1885-86 will be delivered at St. Thomas's Hospital on October 1, at 3 p.m., by A. O. MacKellar, M.Ch., F.R.C.S., in the theatre of the hospital.

AT the request of the Batavian Society of Arts and Sciences, the Government of the Netherlands' Indies has taken a step which might be imitated by other Governments with advantage. It has distributed fifty copies of Prof. de Hollander's "Handleiding bij de Beoefening der Land- en Volkenkunde von Neder. Oost Indië" to its officials in all parts of its colonies, and has instructed them to compare their own observations with the statements in the work, and to report the result.

The German Government has despatched a mission under Baron Pring to the Cheshire salt districts, charged with an investigation of the local industry, and especially of the phenomenon of land subsidence through brine pumping, Prince Bismarck being about to propose certain legislation affecting similar landslips in Germany.

With reference to Mr. G. J. Symons's letter last week on the subject of the trees in Richmond Park struck by lightning, Mr. Percy Smith writes to the *Times* that "the most probable cause of the liability of certain trees to be struck by lightning is that they are bad conductors of electricity. The suggestion that oak trees are struck because they contain iron is both erroneous and absurd. If oak did contain iron it would in all probability increase its conducting power and act as a preservative. If oak contained an estimable quantity of that metal the wood would turn black on exposure to air, on account of the tannin which is present. This blackening may be seen surrounding the iron nails in any oak fence. The contour of the ground, nature of the soil, and the presence or absence of water has more influence in deciding the locality of an electric discharge than the height of a tree. Add to this the difference in conductibility between various woods and we have at once an explanation of the apparent peculiarity of tall trees escaping unharmed while shorter trees are destroyed."

One of the proofs commonly advanced for the theory that the cold in northern regions has increased in historic times is that there is an increase of ice on the eastern shores of Greenland; another is that barley, which was successfully grown in Iceland from its first settlement in 870 down to the middle of the fifteenth century, is no longer cultivated there. It is, therefore, of much interest to learn from *Globus* that the Icelandic Government lately attempted to grow barley in the island on a considerable scale, and that the results were very favourable. Norwegian barley from Altenfjord, which is on the extreme north of the barley-growing zone, was planted and was fit for cutting down in eighty-nine days. The decline in the cultivation of barley in Iceland was really due, not to an increase in the cold, but to the fact that cattle-breeding paid better. Attempts are being made to grow other plants: at Reikjavik a botanical garden has been established, and the seeds of 382 kinds of plants which occur around Christiania have been planted there. It is probable, therefore, that the scanty garden flora of Iceland will be increased in the near future.

At the recent meeting of the French Association at Grenoble, M. de Mortillet read a paper on Tertiary man before the anthropological section. The question, he said, was not to know whether man already existed in the Tertiary epoch as he exists at the present day. Animals varied from one geological stratum to another, and the higher the animals the greater was the variation. It was to be inferred, therefore, that man would vary more rapidly than the other mammals. The problem was to discover in the Tertiary period an ancestral form of man, a predecessor of the man of historical times. M. de Mortillet affirmed that there were unquestionably in the Tertiary strata objects which implied the existence of an intelligent being. These objects have, in fact, been found at two different stages of the Tertiary epoch—in the lower Tertiary at Thenay, and in the Upper Tertiary at Otta, in Portugal, and at Puy Courny, in Cantal. These objects proved that at these two distant epochs there existed in Europe animals acquainted with the use of fires and able more or less to cut stone. During the Tertiary period, then, there lived animals less intelligent than existing man, but much more intelligent than existing apes. M. de Mortillet gives the name of *anthropitheque*, or ape-man, to the species, which, he maintains, was an ancestral form of historic man, whose skeleton has not yet been discovered, but who has made himself known to us in the clearest manner by his works. A number of flints were exhibited from the strata in question, which had been intentionally chipped and exposed to fire. The general opinion of the *savants* assembled at Grenoble was that there can be no longer any doubt of the existence in the Tertiary period of an ancestral form of man.

An ingenious instrument for ascertaining the distances of accessible and inaccessible points from the observer and from each other has been invented by Dr. Luigi Cerebotani, a Professor of the University of Verona. This apparatus consists mainly of a pair of telescopes mounted on a stand and fixed on a tripod for use. The telescopes are both brought to bear on the object, and a reading is then taken from a graduated scale on the instrument, which, compared with a set of printed tables, gives the distance. By this means the inventor obviates the necessity for the base line, which has hitherto had to be laid down in these operations, and he dispenses with all trigonometrical calculations. Distances can be measured between far-off objects, and, by means of a sheet of paper fixed on a drawing-board, a rough plan of the country under measurement can be sketched. In the same way the distances of ships at sea or of moving objects on land can be determined. The apparatus appears to be well adapted for land-surveying, and particularly for military purposes. In fact, it is stated to have been already adopted in the German army in the latter connection, and it is about to be tried by the authorities of our own War Department. A practical trial was made with this instrument on the Thames Embankment on the 11th inst., when its varied usefulness was demonstrated.

We have received from the Director of the Batavia Observatory a volume containing statistics of the rainfall in the East Indian Archipelago for the year 1884. Rainfall observations were made during the year at 145 stations without interruption, although at the end of the year there were 172 stations, 94 of which were on the islands of Java and Madura.

It is stated that the Physical and Mathematical Society of Tokio has decided in future to print its official proceedings in Japanese written in Roman letters instead of Chinese characters, although the authors of papers may employ any style or language they please. A similar step is in contemplation by the Japanese Chemical Society.

In a note in a late issue of the *Bulletin* of the United States Fish Commission, Prof. Verrill discusses the question how long oysters will live out of water. In a fishmonger's in New Haven his attention was drawn to a large cluster of oysters attached to an old boot which hung in the window from about December 10 to February 25, when he found several of the larger oysters still alive. Most of the smaller and many of the larger ones were dead and dried up; in the case of the latter the edges of the shells had been broken or chipped. Those that were alive had all been hung up with the front edge of the shell downward and the hinge upward. They had been hanging in the show window, attached to a gas burner, freely exposed to the air and light. The place was doubtless cool, but the air must have been dry, and temperature variable. The remarkable duration of the lives of these oysters he attributes to two causes: first, the perfect condition of the edges of the shells, which allowed them to close up very tightly; secondly, the position—suspended as they were with the front edge downward—is the most favourable one possible for the retention of water within the gill-cavity, for in this position the edges of the mantle would closely pack against the inner edges of the shell, effectually closing any small leaks, and the retained water would also be in the most favourable position to moisten the gills, even after part had evaporated. It is also possible that when in this position the oyster instinctively keeps the shell tightly closed, to prevent the loss of water. This incident, says Prof. Verrill, may give hint of the best mode of transporting oysters and clams long distances. Perfect shells should be selected, and they should be packed with the front edge downward, and kept moderately cool, in a crate or some such receptacle which will allow a free circulation of air. Under such favourable conditions selected oysters can doubtless be kept from eight to twelve weeks out of water. Mr. Ryder, of Washington, adds that he has had oysters live in the shell for two weeks, where the temperature ranged from 30° to over 80° F., lying on shelves in the cases in his work-room, exposed the whole time to the air, without showing the slightest tendency to decompose.

THE schooner *Rosario*, at New York, reports than on June 23, in lat. 29° 14′ N. and long. 133° 25′ W., at 11 a.m., two heavy shocks of submarine earthquake were experienced. These were about one minute apart, and the last was much heavier than the first, causing the vessel to tremble violently. The sky was overcast, and the sea remarkably smooth.

THE Russian Geographical Society is said by the St. Petersburgh journals to contemplate sending a scientific expedition to the Amour for the purpose of studying the surrounding region with regard to its geographical, historical, and commercial features, as well as its mineral resources.

IT is announced in Brussels that the German Lieutenant Weissmann, who is in the service of the African Association, has discovered that the River Kassaï, which was always believed to join the Congo above the equator station, forms a curve and falls into Lake Leopold II.

ON the night of August 31 to September 1 temperature fell to a lower point in several districts than is known to have ever before happened so early in the season. Over upper and middle Strathspey in particular the frost was very severe. At Kingussie the protected thermometer fell to 24°·9 and the exposed to 18°·0, while at Grantown the exposed thermometer fell to 15°·0, these being all compared instruments and in good order. At Kingussie ice an inch thick was found on the water supplying the hygrometer. In this large district the potato crop is completely destroyed, not only in low-lying situations but also on the high-lying slopes. On the other hand, on crossing from Inverness-shire into Perthshire, the potato crop is safe, the tops being only slightly blackened. At the Ben Nevis Observatory on the same night, with a sky equally clear and cloudless as was over Strathspey, the protected thermometer fell only to 32°·9 and the exposed thermometer to 24°·6, being respectively 8°·0 and 6°·6 higher than occurred at Kingussie on the same night.

THE additions to the Zoological Society's Gardens during the past week include a Barbary Ape (*Macacus inuus*) from North Africa, presented by Miss Bedford; at Bank Vole (*Arvicola pratensis*) from Essex, presented by Mr. E. Rosling; a Common Hedgehog (*Erinaceus europæus*), British, presented by Master C. Hanrott; a Common Polecat (*Mustela putorius*), British, presented by Mr. W. Buckley; an Undulated Grass Parrakeet (*Melopsittacus undulatus*) from Australia, presented by Mdlle. de Nujac; a Smooth Snake (*Coronella lævis*) from Dorsetshire, presented by the Rev. O. P. Cambridge, C.M.Z.S.; two Douglass's Horned Lizards (*Phrynosoma douglassi*) from New Mexico, presented by Dr. R. W. Shufeldt; two Common Chameleons (*Chamæleon vulgaris*) from North Africa, presented by Mr. F. Bland.

ASTRONOMICAL PHENOMENA FOR THE WEEK, 1885, *SEPTEMBER* 20–26

(FOR the reckoning of time the civil day, commencing at Greenwich mean midnight, counting the hours on to 24, is here employed.)

At Greenwich on September 20

Sun rises, 5h. 44m.; souths, 11h. 53m. 16·2s.; sets, 18h. 2m.; decl. on meridian, 0° 56′ N.: Sidereal Time at Sunset, 18h. 1m.

Moon (Full on Sept. 24) rises, 16h. 21m.; souths, 21h. 21m.; sets, 2h. 27m.*; decl. on meridian, 12° 12′ S.

Planet	Rises	Souths	Sets	Decl. on meridian
	h. m.	h. m.	h. m.	° ′
Mercury ...	4 1 ...	10 50 ..	17 39 ...	8 51 N.
Venus ...	9 12 ...	14 7 ...	19 2 ...	13 11 S.
Mars ...	0 23 ...	8 21 ...	16 19 ...	20 42 N.
Jupiter ...	4 52 ...	11 23 ...	17 54 ...	5 21 N.
Saturn ...	22 27* ...	6 35 ...	14 44 ...	22 20 N.

* Indicates that the rising is that of the preceding and the setting that of the following day.

Occultations of Stars by the Moon

Sept.	Star	Mag.	Disap.	Reap.	Corresponding angles from vertex to right for inverted image
			h. m.	h. m.	° °
20 ...	18 Aquarii	... 6	... 18 47	... 19 55	... 49 305
21 ...	B.A.C. 7774	... 6	... 22 8	... 23 22	... 136 283
24 ...	B.A.C. 8365	... 6½	... 5 12	... 6 5	... 124 350
25 ...	μ Piscium...	... 5	... 20 12	... 21 9	... 94 233
26 ...	B.A.C. 741	... 6½	... 21 19	... 22 3	... 26 299

The Occultations of Stars are such as are visible at Greenwich.

Sept.	h.	
20 ...	8 ...	Mercury at least distance from the Sun.
22 ...	– ...	Sun in equator.
24 ..	– ...	Partial eclipse of the Moon, but the Moon will set at Greenwich at about sunrise whilst partly obscured by the penumbra and before entering the shadow.

SCIENTIFIC SERIALS

The Proceedings of the Royal Society of Queensland, 1884, vol. i. parts 2, 3, 4.—We are glad to see that this new Society in one of our leading colonies is advancing rapidly. In the parts before us Mr. Tryon describes certain rock-drawings of the aborigines of Queensland, of a class hitherto undescribed (with plates). Mr. C. W. de Vis, who is one of the most indefatigable contributors, writes on new Australian lizards; on a new form of the genus Therapon; on new Queensland lizards; on a new species of Hoplocephalus; on an apparently new species of Halmaturus; on a new species of Hyla; a description of new snakes with a synopsis of the genus Hoplocephalus; on the fauna of the Gulf of Carpentaria, and a conspect of the genus Heteropus. Mr. Bailey gives instalments of his contributions to Queensland Flora. Mr. Broadbent writes on the migrations of birds at the Cape York peninsula, which is a peculiarly favourite spot for observing the migrations of birds from and to New Guinea, for the passage is shortest here. Ethnology is well represented in the numbers before us, for, besides the paper by Mr. Tryon mentioned above, we have one by Dr. Bancroft on the food of the aborigines of Central Australia, and one by Mr. Duffield on the inhabitants of New Ireland and its archipelago, their fine and industrial arts, customs, and language, especially their tattooing. Mr. Knight describes a new species of Parmelia, and Baron von Müller, the *Dendrobium cincinnatum*, sp. nov. Mr. Bernays describes exotic fruits new to Queensland. Mr. Pink pleads for the practice of hybridisation of plants; and Dr. Bancroft describes experiments with Indian wheats in Queensland. There are numerous other minor contributions.

SOCIETIES AND ACADEMIES

PARIS

Academy of Sciences, August 31.—M. Bouley, President, in the chair.—On the cyclonic character of the solar spots, in reply to M. Tacchini's objection, by M. Faye. In their normal state the spots, like terrestrial cyclones, are described as of circular form, with funnel-shaped penumbra, concentric circumferences,